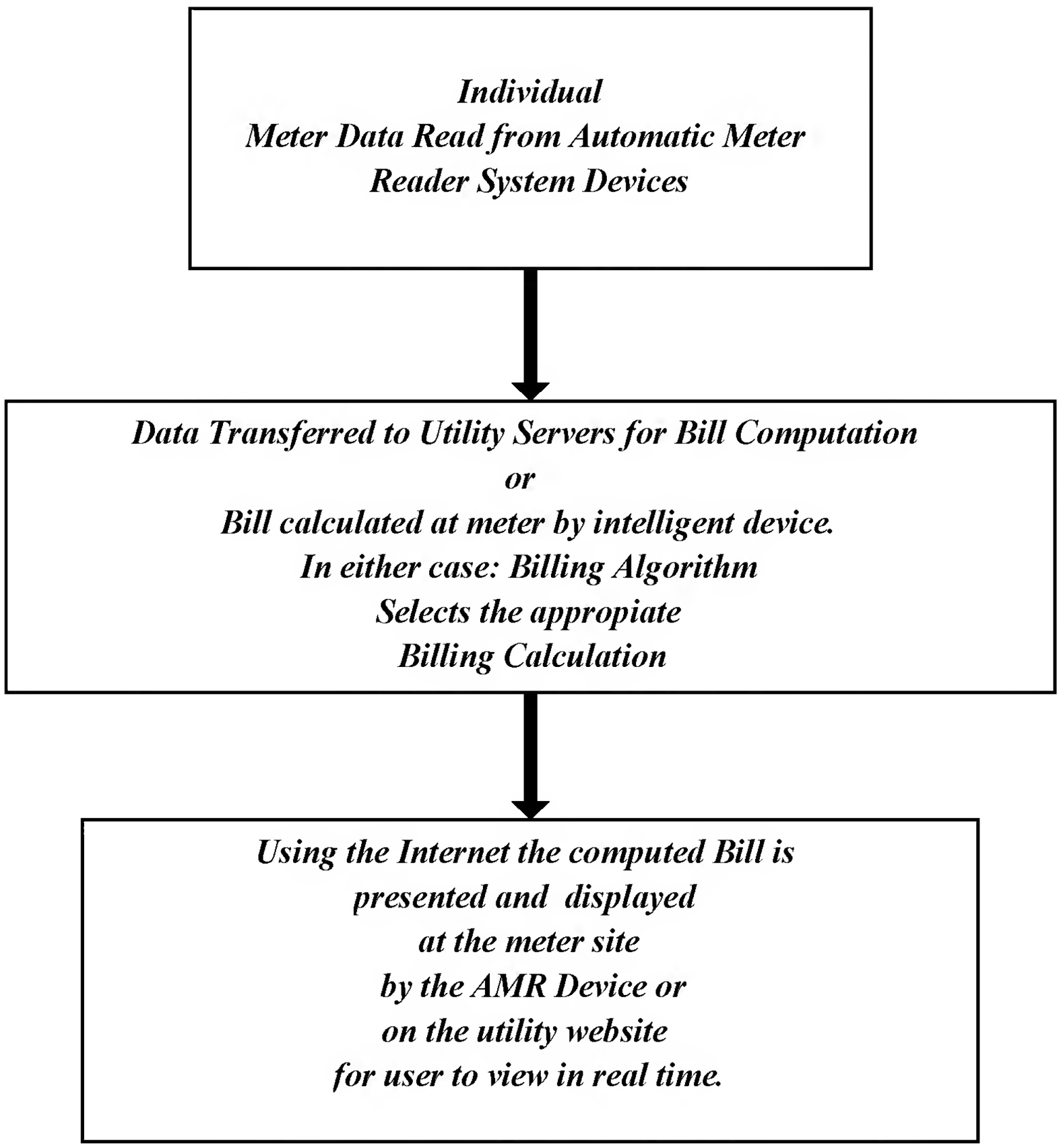
Individual
Meter Data Read from Automatic Meter
Reader System Devices
Data Transferred to Utility Servers for Bill Computation
or
Bill calculated at meter by intelligent device.
In either case: Billing Algorithm
Selects the appropiate
Billing Calculation
Using the Internet the computed Bill is
presented and displayed
at the meter site
by the AMR Device or
on the utility website
for user to view in real time.

Fig. 1

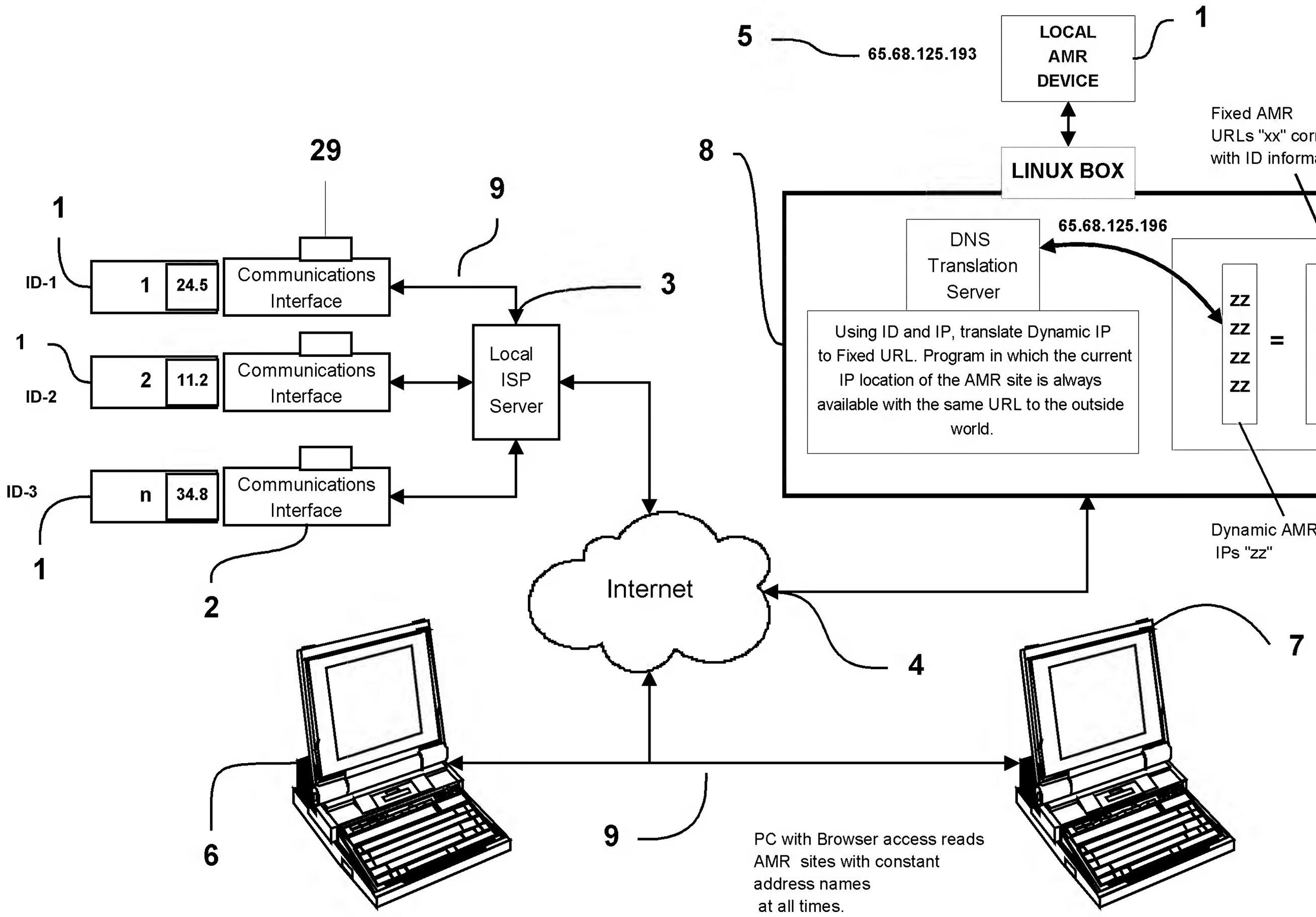
5
65.68.125.193
LOCAL
AMR
DEVICE
1
LINUX BOX
8
Fixed AMR
URLs "xx" correlated
with ID information.
65.68.125.196
DNS
Translation
Server
Using ID and IP, translate Dynamic IP
to Fixed URL. Program in which the current
IP location of the AMR site is always
available with the same URL to the outside
world.
zz
zz
zz
zz
=
xx
xx
xx
xx
Dynamic AMR
IPs "zz"
5
29
9
1
ID-1
1
24.5
Communications
Interface
3
1
ID-2
2
11.2
Communications
Interface
Local
ISP
Server
ID-3
n
34.8
Communications
Interface
1
2
Internet
4
7
6
9
PC with Browser access reads
AMR sites with constant
address names
at all times.

Fig. 2

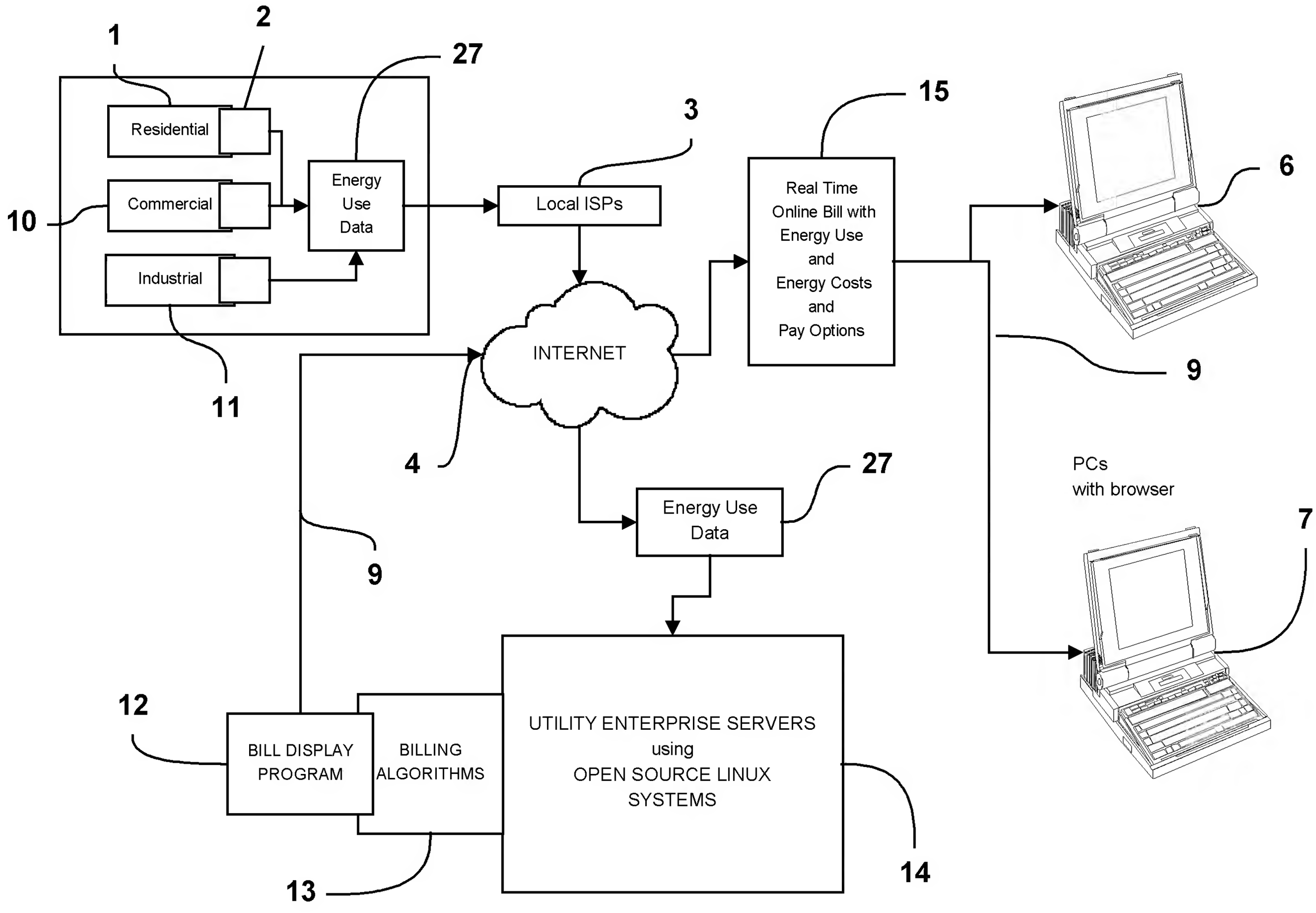
1
2
27
Residential
Commercial
Industrial
10
11
Energy
Use
Data
3
Local ISPs
15
Real Time
Online Bill with
Energy Use
and
Energy Costs
and
Pay Options
6
INTERNET
4
9
27
Energy Use
Data
PCs
with browser
7
12
BILL DISPLAY
PROGRAM
BILLING
ALGORITHMS
UTILITY ENTERPRISE SERVERS
using
OPEN SOURCE LINUX
SYSTEMS
13
14

Fig. 3

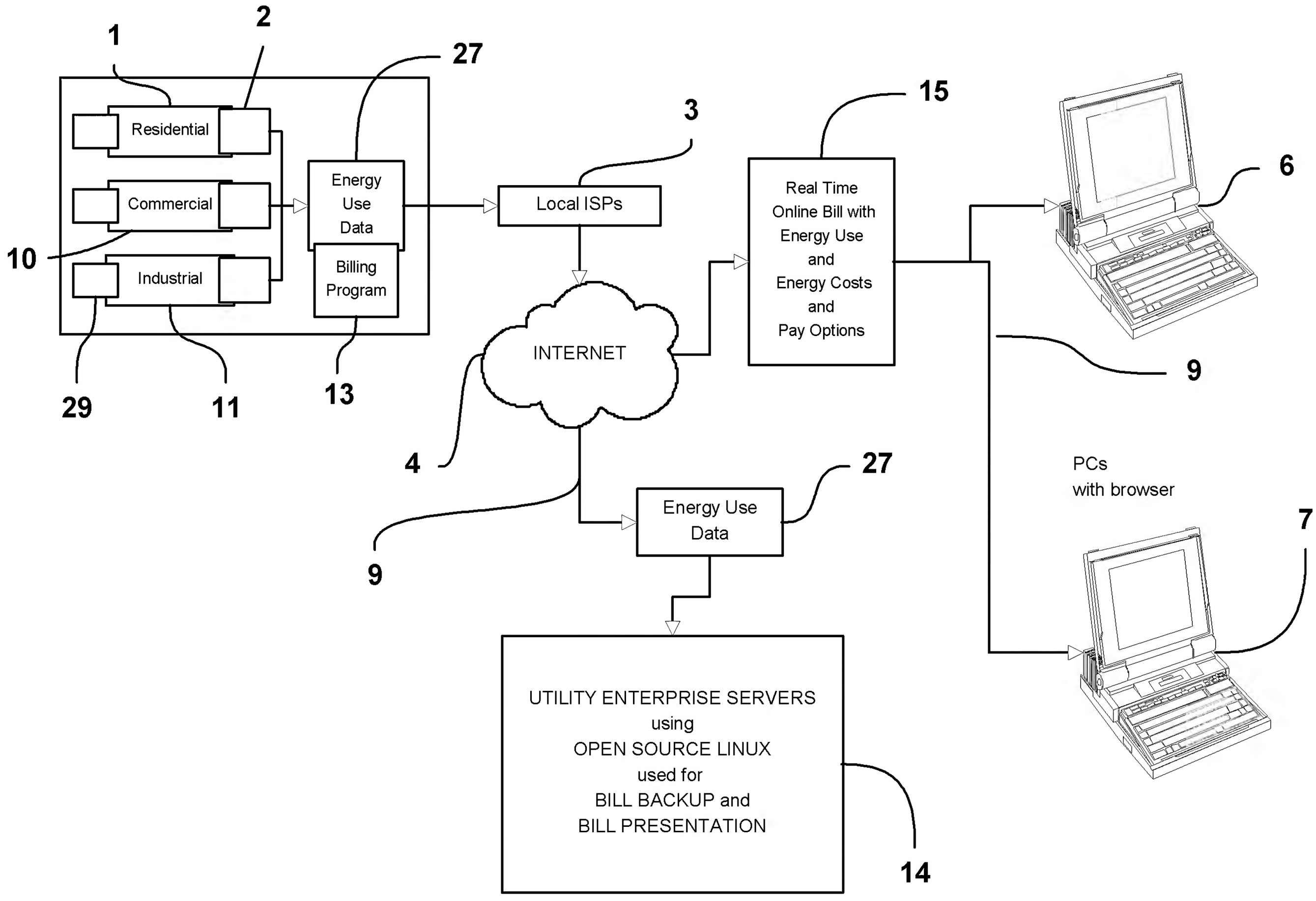
1
2
27
Residential
Commercial
Industrial
10
Energy
Use
Data
Billing
Program
29
11
13
3
Local ISPs
INTERNET
4
9
15
Real Time
Online Bill with
Energy Use
and
Energy Costs
and
Pay Options
6
9
PCs
with browser
7
27
Energy Use
Data
UTILITY ENTERPRISE SERVERS
using
OPEN SOURCE LINUX
used for
BILL BACKUP and
BILL PRESENTATION
14

Fig. 4

Untitled Normal Page - Microsoft Internet Explorer

OGE

ELECTRIC SERVICE BILL
OGE
CRAWFORD ST.
NORMAN. OKLAHOMA 73069

Customer Name	Service address
ILA MATHEWS	330 W Gray St, Norman, OK.

BILLING PERIOD		METER READINGS		METER CONSTANT	KILOWATT HOURS	ACCOUNT NUMBER
From	To	Previous	Present			
04/29/00	05/30/00	45470	46066	1	596	761460-5

RESIDENTIAL RATE

CHARGE FOR ELECTRIC SERVICE	$ 51.17
FRANCHISE FEE	$ 1.54
SALES TAX	$ 1.58
CURRENT BILL	$ 54.29

FUEL ADJ. FACTOR
$0.000868/KWH

TOTAL AMOUNT DUE $ 54.29

A LATE PAYMENT CHARGE OF $0.81 (1.5%0) WILL BE ADDED
IF PAYMENT IS NOT RECEIVED BY 06/21/2000

Pay all of Bill — Click Here

Pay part of Bill $ — Click Here

E-Mail Question or Comment to Utility — Click Here

Close Window

17 18 19 20 22 23 24

Fig. 5

UNIGAS CORPORATION

Residential Utility Meter Prototype

ELECTRIC METER DATASET

25

```
@startloc

Henry Crichlow
330 W Gray St, Suite 504
Norman, OK
73069

@endloc
```

26

```
 Energy use TABLE
 Hour    kWh

@startdata
15       562
16       564
17       565
18       566
19       567
20       568
21       569
22       570
23       571
 0       572
 1       574
 2       575
 3       576
```

27

28

Fig. 6

Possible Modes

I	Server mode - meter device reads data and sends to server to compute, & display bill as webpage on company server.
II	Client mode - meter device computes bill, displays bill online as webpage at meter site. Client meter behaves like a microserver device.
III	Hybrid Server mode - Meter device computes bill, send info to server for display and bill payment. Bill is displayed at both meter site and company server site.

Fig. 7

I	Server Based - bill is computed, presented, stored, displayed and paid at company server

Step	Action Implemented
1	Meter energy use data is obtained by metering device
2	Usage data sent via isp and internet to company server
3	Company server selects the appropiate billing algorithm
4	Company server program computes bill
5	Bill data is converted to HTML or XML code
6	Bill data is displayed on website as online bill
7	Process loops continuously from 1 through 6 to provide real time updating of billing data
8	Customer logs on to website
9	Customer reads bill online
10	Customer decides to pay bill online or pay via offline channels like mail

Fig. 8

II	Client Based - bill is computed, presented, stored, displayed and paid at meter microserver
[redacted]	[redacted]
Step	Action Implemented
1	Meter energy use data is obtained by intelligent metering device
2	Billing algorithm is coded into program at meter site
3	Client device computes bill
4	Bill data is sent to company server via internet and stored on company server as backup
5	Bill data is converted to HTML or XML code at client microserver
6	Bill data is displayed online at webpage on client microserver
7	Process loops continuously from 1 through 6 to provide real time updating of billing data
8	Customer logs on to website via internet
9	Customer reads bill online at meter microserver
10	Customer decides to pay bill online or pay via offline channels like mail

Fig. 9

III	Hybrid Based - bill is computed, presented, stored, displayed and paid at company serve and or meter site.

Step	Action Implemented
1	Meter energy use data is obtained by intelligent metering device
2	Billing algorithm is coded into computer software at meter site
3	Client device computes bill, behaves like a micro-server
4	Action (1)
5	Computed bill data is sent to company server via internet
6	Computed bill data is converted to HTML or XML code on company server
7	Computed bill data is displayed on website as online bill on company server
8	Action (2)
9	Computed bill Data is stored at client meter site
10	Computed bill data is converted to HTML or XML code on client meter site
11	Computed bill data is displayed on website at meter microserver as online bill
12	Process loops continuously from 1 through 11 to provide real time updating of billing dat
13	Customer logs on to internet and finds websites at meter or at company URL locations
14	Customer reads bill online either at company server or at meter microserver itself
15	Customer decides to pay bill online or pay via offline channels like mail

Fig. 10

PRICES:

Customer Charge: $6.50 per customer per month

Time-of-Use Meter Charge: $6.00 per customer per month for five Summer Season months.

Energy Charge:

Summer Season: The five OG&E Revenue Months of June through October.

On-Peak Hours: 20.55c per kWh per month. From June 1 through September 30, beginning each day at 1:01 PM through 7:00 PM local time, excluding Saturdays, Sundays, Independence Day (as observed) and Labor Day.

Off-Peak Hours: 3.18c per kWh per month. All hours not defined as On-Peak hours.

Winter Season: The seven OG&E Revenue Months of November through May of the succeeding year.

First 600 kWh per month: 7.8 c per kWh.
All additional kWh per month: 3.18c per kWh.

Fig. 11

Customer Charge/Month			$6.50	(a)
TOU Meter Charge/Month			$6.00	(b)
Energy Charge - Summer Season				
On Peak Hours Costs		$0.2055	KwHr/Mo	(c)
Off Peak Hours Cost		$0.0318	KwHr/Mo	(d)
Energy Use				
On Peak Hours KwHr		2,345	KwHr	(e)
Off Peak Hours KwHr		488	KwHr	(f)
Total Energy Use		2,833	KwHr	(g)
Energy Costs				
Off Peak Use		$481.90		(h)
Off Peak Use		$15.52		(i)
Total Energy		$497.42		(j)
Total Costs =	$509.92			(k)

Calculation Algorithm : (k) = (a) + (b) x [(e) x (c) + (f) x (d)]

Fig. 12

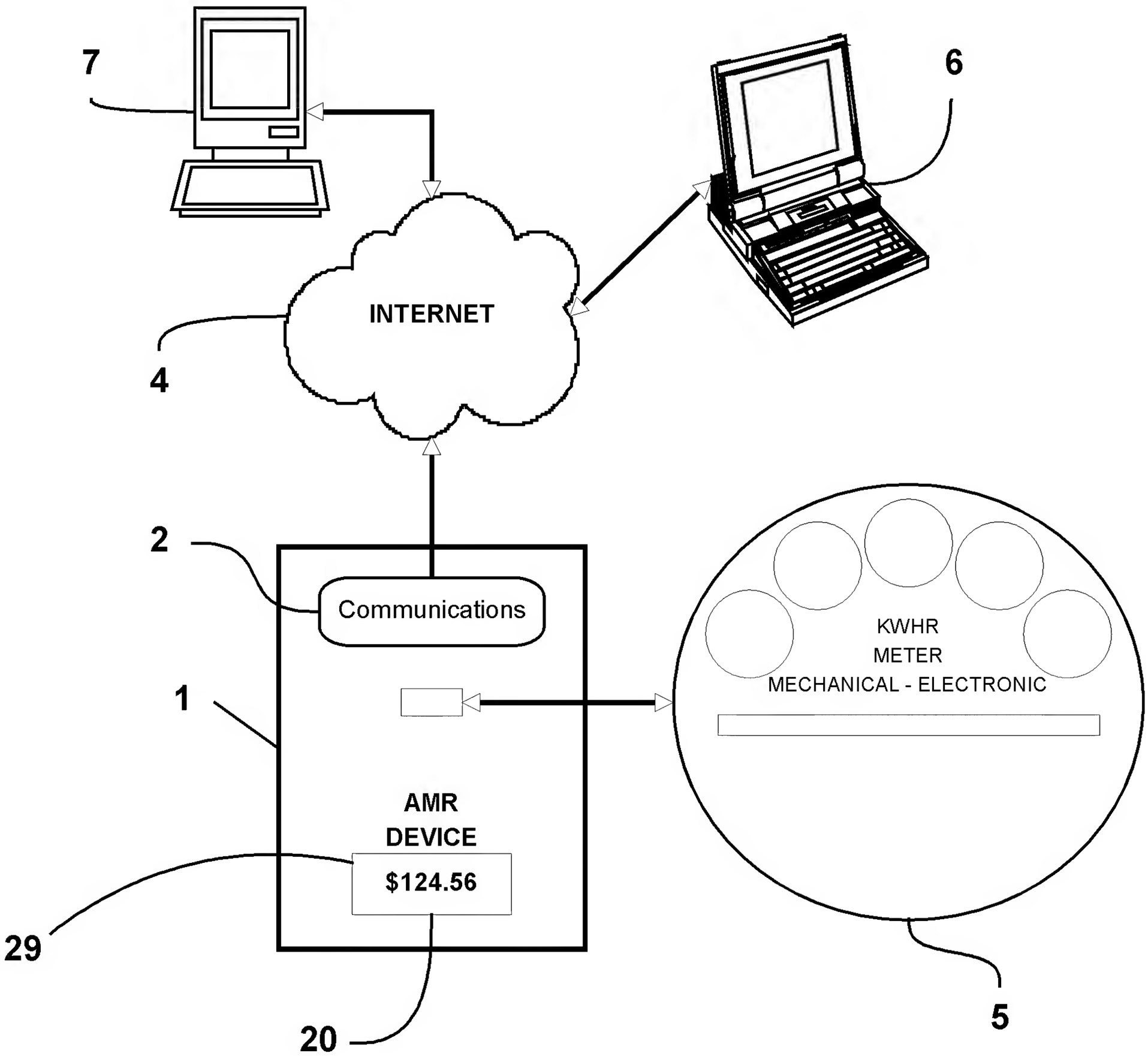
7
6
INTERNET
4
2
Communications
1
KWHR
METER
MECHANICAL - ELECTRONIC
AMR
DEVICE
$124.56
29
20
5

Fig. 13